RICE UNIVERSITY

An Investigation of the Validity of Implicit Measures of Personality

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

Master of Arts

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APRIL, 2007
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ABSTRACT

An Investigation of the Validity of Implicit Measures of Personality

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The current research examines the construct validity of Implicit Association Tests designed to measure two of the Big Five factor traits, Extraversion (EIAT) and Conscientiousness (CIAT), and whether or not these IATs predict performance for retail Sales Representatives. In Study 1 and 2, undergraduate students completed self-report measures of personality and the EIAT and CIAT. Results provide evidence of the construct validity for both the EIAT and CIAT. In Study 3, a concurrent validity study was conducted with a sample of cell phone retail sales employees. Results of Study 3 provide evidence of criterion-related validity for the EIAT and CIAT. The combined results of the three studies suggest the EIAT and CIAT may be useful personality measures in a selection context.
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Introduction

In the field of Industrial-Organizational psychology, the Big Five personality factors have predicted several behavioral and psychological phenomena including leadership (Judge & Bono, 2000), training performance (Herold, Davis, Fedor, & Parsons, 2002; Martocchio & Judge, 1997), self-efficacy and skill acquisition (Colquitt, Lepine, & Noe, 2000), and team behavior and performance (Barry & Stewart, 1997). Despite the robust literature on personality-performance relationships, the value of personality testing in applicant settings is questioned due to response distortion that may affect self-report personality tests (Rothstein & Goffin, 2006). From a practical standpoint, response-distortions affect the perceived usefulness of personality tests for making personnel decisions. In addition to the concerns over response distortion, self-report measures of personality may also be insufficient for predicting some behaviors that occur in work settings (Egloff & Schmukle, 2002). Consistent with this notion, recent research has shown differential prediction of behaviors for self-report, or explicit, measures of personality and implicit, or nonconscious, measures of personality (Asendorpf, Banse, & Mucke, 2002; Egloff & Schmukle, 2002).

Due to possible response distortion on self-report measures of personality and recent evidence that self-report personality measures may not predict some behaviors, researchers are focusing on the development of implicit measures of personality that may complement self-report measures. One measure that has received attention in previous research (Brunstein & Schmitt, 2004) is the Implicit Association Test, or IAT, a computer-based categorization task that measures the relative strengths of association between pairs of objects in memory (Greenwald, McGhee, & Schwartz, 1998).
Researchers have recently adapted the IAT to measure different personality constructs and research has demonstrated evidence of both convergent and divergent relations with self-report personality measures with these IAT personality measures (Asendorpf et al., 2002; Brunstein & Schmitt, 2004). In support of the IAT as a measure of personality, Haines and Sumner (2006) recently called for researchers to develop Implicit Association Test measures of Extraversion and Conscientiousness and to present evidence of criterion-related validity for these measures. In the following sections, research relevant to the current study on personality-performance relationships is discussed, followed by research on response distortion, differential behavior predictions of implicit and explicit measures, and Implicit Association Testing.

Personality-Performance Relationships

*Extraversion, Conscientiousness, and Job Performance*

The current structure of the Big Five factor model is well established (Donahue, 1994; Goldberg, 1990, 1992, 1993; Hofstee, Kiers, de Raad, & Goldberg, 1997; John & Srivastava, 1999; Saucier, & Goldberg, 1996). The Big Five factors are generally represented by Extraversion, Agreeableness, and Conscientiousness, Openness to Experience or Intellect, and Neuroticism/Emotional Stability. Extraversion is normally represented by descriptors such as sociable, talkative, energetic, and/or ambitious. Agreeableness includes characteristics such as courteous, cooperative, flexible, tolerant, and forgiving. Conscientiousness includes descriptors such as careful, thorough, organized, and hardworking, persevering, and/or achievement oriented (Mount, Barrick, & Strauss, 1993; Goldberg, 1993). Descriptors of Neuroticism include anxious,
emotional, insecure, nervous, and/or fearful. Openness to Experience includes characteristics such as imaginative, intelligent, original, and/or curious (Mount et al., 1993). The current paper focuses on Extraversion and Conscientiousness, as these traits have been found to predict job performance. Conscientiousness is a fairly consistent predictor across all jobs; Extraversion is especially important for managerial and sales jobs (Barrick & Mount, 1991).

Several meta-analyses have examined the relationship between Extraversion and Conscientiousness and job performance (Barrick, Mount, & Judge, 2001; Tett, Jackson, & Rothstein, 1991). Barrick and Mount (1991) examined the criterion-related validities of the Big Five factor traits for predicting three different criteria (job proficiency, training proficiency, and personnel data), across five occupational groups including police, managers, sales, skilled/semi-skilled, and professionals. Job proficiency data included performance ratings and productivity data; training proficiency included training performance ratings and work sample data; and personnel data included information on employees including turnover, tenure, and salary level (Barrick & Mount, 1991). The results showed that Conscientiousness significantly predicted job performance across all five occupational groups in the study. The true score correlations ranged from $\rho = .20$ to .23. Conscientiousness was also a valid predictor for each of the three criterion types examined. True-score correlations were all significant and ranged from $\rho = .20$ to .23. Results also indicated that Extraversion was a valid predictor of job performance for managerial ($\rho = .18, p < .05$) and sales occupations ($\rho = .15, p < .05$). Conscientiousness and Extraversion reliably predicted both subjective ($\rho = .26, p < .05$ and $\rho = .14, p < .05$ for Conscientiousness and Extraversion, respectively) and objective performance criteria.
\(\rho = .14, p < .05\) and \(\rho = .10, p < .05\) for Conscientiousness and Extraversion respectively).

Other meta-analyses have replicated Barrick and Mount's (1991) study. In a meta-analysis including data from the European community, Salgado (1997) found that Conscientiousness was a significant predictor of job performance across all criteria and all occupations. True-score correlations ranged from \(\rho = .16\) to \(r = .39\). Extraversion was also a valid performance predictor in occupations requiring person-to-person interaction (managers and police). In addition, Hurtz and Donovan (2000) found similar results in that Conscientiousness was the most valid predictor of job performance across all occupations and performance criteria (true-score coefficients ranged from \(\rho = .17, p < .05\) to \(\rho = .29, p < .05\)), and Extraversion significantly predicted performance across criterion types for sales occupations (\(\rho = .15, p < .05\)) and managerial occupations (\(\rho = .12, p < .05\)).

Barrick, Mount, and Judge (2001) conducted a meta-analysis of fifteen prior personality-performance meta-analyses and found similar results to those obtained by Barrick and Mount (1991), Salgado (1997), and Hurtz and Donovan (2000). Specifically, their results indicated that Conscientiousness was again a predictor of work performance across all occupations examined. True-score correlations were all significant and ranged from \(\rho = .23\) to \(\rho = .25\). Conscientiousness also significantly predicted performance across performance criteria. That is, Conscientiousness predicted both supervisor ratings (\(\rho = .31, p < .05\)) and objective performance criteria (\(\rho = .23, p < .05\)). Extraversion was found to predict work performance in sales occupations, police jobs, and managerial occupations, with true-score correlations ranged from \(\rho = .11, p < .05\) to \(\rho = .22, p < .05\).
Extraversion also significantly predicted performance across criterion types and equally predicted objective criteria and subjective criteria ($\rho = .13$, $p < .05$).

The meta-analyses discussed previously involved multiple occupations and performance criteria. However, a large body of research exists that directly examines the relationship between personality and job-performance in sales jobs (Barrick, Stewart, & Piotrowski, 2002; Stewart, 1999; Thoresen, Bradley, Bliese, & Thoresen, 2004). In general, results from these studies have shown that Conscientiousness and Extraversion predict performance for the sales jobs examined. Specifically, Extraversion and Conscientiousness predicted supervisor ratings of performance ($\rho = .18$, $p < .05$ for Extraversion and $\rho = .21$, $p < .05$ for Conscientiousness) and objective sales ($\rho = .22$, $p < .05$ for Extraversion and $\rho = .31$, $p < .05$ for Conscientiousness; Vinchur, Shippmann, Switzer, & Roth, 1998).

One fact that emerges from the previous review of personality-performance literature is that the effects of personality on all performance criteria are small. However, these measures account for incremental validity over other predictors of job performance (Schmidt & Hunter, 1998). For example, Goffin, Rothstein, and Johnston (1996) examined the incremental validity of personality predictors over assessment center scores in the prediction of job performance in managerial jobs. Results indicated that the personality predictors added incremental validity over assessment center scores. Other research has shown that personality measures add incremental validity over biodata measures (McManus & Kelly, 1999), and general mental ability tests (Schmidt & Hunter, 1998).

**Summary**
Personality traits are important predictors of job performance. Specifically, Conscientiousness is a valid predictor across occupations and across performance criteria and Extraversion is a valid predictor of job performance in sales and managerial occupations. Both Conscientiousness and Extraversion predict objective and subjective performance criteria. In addition, Extraversion and Conscientiousness account for unique variance in job performance that is not accounted for by other predictors like cognitive ability, biodata, and assessment centers (Goffin et al., 1996; McManus & Kelly, 1999; Schmidt & Hunter, 1998).

Despite the validity of personality measures in predicting performance, one pervasive concern with personality testing is that self-report measures of personality can be affected by response distortion (Rothstein & Goffin, 2006). Another potential issue with self-report measures is that they measures may only predict certain types of behaviors (Asendorpf et al., 2002). The issues of response distortion and differential behavior predictions of self-report and implicit measures will be discussed in subsequent sections.

Implicit and Explicit Measures

Based on industry reports, personality testing is currently estimated to be a $400 million dollar industry in the United States (Rothstein & Goffin, 2006) with over 2500 test publishers in the United States alone (Hough & Oswald, 2005). Despite the prevalence of personality testing, practical concerns over response distortion on personality tests may prevent many organizations from utilizing them as part of the selection process. Rothstein and Goffin (2006) recently expressed this sentiment in stating that “it is arguable that the most pervasive concern HR practitioners have had
regarding the use of personality testing in personnel selection is that applicants may strategically ‘fake’ their responses and thereby gravely reduce the usefulness of personality scores” (p.165). Previous research has supported the fakeability of self-report personality measures (Donovan, Dwight, & Hurtz, 2003; Furnham, 1997; Griffin, Hesketh, & Grayson, 2004; McFarland & Ryan, 2000; Rosse, Stecher, Levin, & Miller, 1998; Viswesvaran & Ones, 1999). Furthermore, research has demonstrated that (1) the effects of faking are often large in “fake good” “fake bad” studies, (2) faking can decrease the quality of applicants selected by resulting in more discrepant hires as the selection ratio decreases, and (3) faking is pervasive with substantial percentages of job applicants reporting distorting responses on personality-based assessments to appear more conscientious and agreeable and also de-emphasize their negative attributes (Christiansen, Goffin, Johnston, & Rothstein, 1994; Donovan et al., 2003; Furnham, 1997; Mueller-Hanson, Heggestad, & Thornton, 2003).

Despite existing evidence of the fakeability of self-report personality measures, research has also shown that in real applicant settings, response distortion does not affect the criterion-related validities of personality tests (Barrick & Mount, 1996; Hough et al., 1990; Ones, Viswesvaran, and Reiss, 1996). Although research has shown that the validity of personality testing is not affected by response distortion, the susceptibility of self-report personality measures to response distortion vis-à-vis faking still concerns HR professionals (Rothstein & Gioffin, 2006). In light of this concern over faking on personality measures, researchers have begun to look for alternate ways to assess personality. Theoretically, implicit measures would eliminate faking by allowing
researchers to measure individuals’ personality traits without them being able to consciously manipulate the results.

Recently, Asendorpf et al. (2002) addressed the difference between explicit and implicit measures of the personality self-concept. The authors defined the self-concept of personality at the construct level as “an associative network containing all associations of the concept of self with attribute concepts describing one’s personality” (p.381). These attributes describe quite stable, individual characteristics of a person. Explicit measures are based on information that individuals deliberately provide about themselves. Implicit measures do not overtly ask respondents to provide information about themselves or require respondents to identify past patterns of behavior; therefore, they are not based on information that is deliberately given to inform about the self. These measures contain valid information about respondent’s personalities to the extent that they are properly designed and able to accurately assess respondents’ associative networks in memory. Furthermore, implicit measures are often more resistant to response distortion because they do not require introspection on the part of respondents (Greenwald et al., 1998).

Previous research has shown that explicit and implicit measures are correlated in situations in which there is no impetus to engage in presenting oneself in a socially desirable (Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Fazio, Jackson, Dunton, & Williams, 1995; Steffens, 2004) or self-deceptive way (Greenwald et al., 2002; Paulhus, 1984). However, research has also shown that implicit and explicit measures diverge when environmental cues or attributes motivate an individual to present themselves differently than would their internal attitudes and beliefs (Egloff & Schmukle, 2002; Kim, 2002; Steffens, 2004; Poehlman, Uhlmann, Greenwald, & Banaji, 2006).
Research also suggests that implicit and explicit measures may be related to different types of information processing (controlled/reflective and automatic/impulsive processing; Fazio, 1990, Strack & Deutsch, 2004). Fazio’s (1990) motivation and opportunities as determinants of processing model (MODE) suggests that behavioral responses can be affected by both conscious controlled cognition, or by automatic responses to an attitude object or evaluation. Controlled information processing is likely to occur when there is adequate time and an individual is motivated to assess consequences of his/her potential actions/behaviors, and when motivation to assess consequences of potential actions/behaviors is low and/or time is limited automatic/spontaneous processing is more likely to occur. Furthermore, the MODE model postulates that when there is adequate time and motivation to assess consequences of potential actions, explicit evaluations/attitudes resulting from controlled processing will drive behavioral responses, but when motivation is low (e.g. task is unimportant to an individual) and/or time pressure is present, implicit evaluations/attitudes resulting from automatic/spontaneous processing will exert greater influence on behaviors.

_Differential Behavior Prediction of Implicit and Explicit Measures_

In addition to the resistance of implicit measures to response distortion, implicit measures (including IAT, priming and other latency-based measures) have been shown to predict different categories of behaviors than explicit measures. Previous research has made a distinction between two categories of behaviors; controlled and spontaneous behaviors (Fazio, 1990). These two categories of behaviors are associated with different modes of information processing (Fazio, 1990; Strack and Deutsch, 2004). Previous
stereotyping and skill acquisition research have defined controlled behaviors as those behaviors that derive from controlled processing and spontaneous behaviors as behaviors that result from spontaneous or automatic information processing (Asendorpf et al., 2002; Fazio, 1990). Controlled behaviors result from effortful, conscious information processing and are often motivation-based (Strack & Deutsch, 2000). Spontaneous behaviors are the direct result of information processing that operates on a unconscious level and are typically beyond the conscious control of individuals. In the stereotyping literature, spontaneous behaviors are considered schema-based and allow individuals to act without conscious thought, whereas controlled behaviors are not schema-based and therefore are the result of more effortful, conscious information processing (Fazio, 1990). Additionally, in the skill acquisition literature controlled behaviors are seen as those behaviors that occur in the early stages of skill acquisition when effortful, conscious thought must be used in order to learn a new skill. As the skill is learned, it becomes automatized and individuals are able to complete tasks without much conscious thought or effort. When skill acquisition reaches this stage, the skill is said to be automatized or automatic. Automatized behaviors, in this sense, are essentially spontaneous behaviors that occur on an unconscious level.

Differential prediction of these two categories of behaviors by implicit and explicit measures have been found in studies on implicit attitudes (Bargh, 1999; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Dovidio, Kawakami, & Gaertner, 2002) implicit activation of stereotyping (Bargh, Chen, & Burrows, 1996, Chen & Bargh, 1997) and self-esteem (Spalding & Hardin, 1999). For example, Word, Zanna, and Cooper (1974) found that negative nonverbal behavior (i.e. speech errors and sitting distance)
aimed towards blacks was not related to self-reported racial attitudes. In addition, Dovidio et al. (1997) found that explicit measures of racial attitudes predicted controlled behaviors (i.e. deliberate bias in ratings of black interviewers relative to white interviewers) but did not predict spontaneous racial behaviors associated with discomfort and negative feelings towards blacks (i.e. blinking rate and eye contact). More importantly, implicit measures predicted eye contact and blinking rate, but did not predict deliberate ratings of black relative to white interviewers. Dovidio et al. (2002) also found that an implicit measure of attitudes towards blacks predicted nonverbal friendliness behaviors toward blacks but not verbal friendliness towards blacks, and explicit measures of attitudes towards blacks predicted verbal friendliness but not nonverbal friendliness behaviors towards blacks.

In a study of behavioral predictions of implicit and explicit self-esteem measures, Spalding and Hardin (1999) found that an implicit measure of self-esteem predicted observer rated nonverbal anxiety during an interview but did not predict self-reported anxiety, and an explicit measure of anxiety predicted self-reported anxiety during the interview but not observer rated nonverbal anxiety. In the domain of implicit measures of personality, Asendorpf et al. (2002) showed that an implicit measure of shyness predicted spontaneous facial movements and speech illustrators (nonverbal behaviors) better than an explicit measure of shyness. In addition, Asendorpf et al. also found that the explicit measure of shyness was better able to predict controlled behaviors such as speech and duration of body movements.

Summary
Implicit measures are more likely to predict spontaneous behaviors, or nonverbal behaviors that occur outside of individuals’ control, while explicit measures are more likely to predict more controlled behaviors, or deliberate behaviors under the conscious control of individuals (Chen & Bargh, 1997; Dovidio et al., 2002). In regard to the current study, this line of research suggests that self-report measures of personality may not predict the same work behaviors as implicit measures of personality. Additionally, the MODE model suggests that implicit and explicit measures may differentially predict objective and subjective performance criteria. In a sales context, supervisor’s ratings of employee behaviors are likely based on first-hand observations of employees in work settings. As sales employees are typically aware of the supervisor’s presence they may be more motivated to consciously monitor their behavior and thus exhibit more controlled behaviors. In this sense, supervisor ratings would be based more on controlled behaviors of employees than on spontaneous behaviors employees’ exhibit. Conversely, objective assessments of performance would be based on behaviors employees typically exhibit. These routine behaviors are more likely to be automatized and spontaneous than the behaviors potentially motivated by supervisors’ presence; therefore, implicit measures may better predict objective performance criteria and explicit measures may better predict subjective performance criteria. Two questions this study is designed to address are whether or not implicit measures of personality, specifically IAT measures, (1) provide information about individuals’ personalities that is less influenced by response distortion than self-report measures, (2) predict different categories of work behaviors than self-report measures.

Implicit Association Test
The Implicit Association Test, or IAT (Greenwald et al., 1998), is a computer-based categorization task designed to measure relative strengths of association among concepts in memory without requiring introspection on the part of the subject. The IAT is easy to implement and previous research has shown that the IAT generates large effect sizes and possesses good reliability (Greenwald & Nosek, 2001). Initial applications of the IAT focused on implicit attitude measurement (Dasgupta, McGhee, Greenwald, & Banaji, 2000; Greenwald et al., 1998; Greenwald et al., 2001), but researchers have also expanded its use to include measures of self-concept (Greenwald et al., 2002a; Greenwald & Farnham, 2000; Perkins, Forehand, & Greenwald, 2005, 2006; Spalding & Hardin, 1999), stereotypes (Greenwald et al., 2002; Nosek, Banaji, & Greenwald, 2004; Rudman, Greenwald, & McGhee, 2001), and self-esteem (Greenwald et al., 2002). In addition, research has supported the resistance of Implicit Association Tests to response distortion and self-presentation when respondents have limited experience and/or are not provided with explicit strategies on how to distort responses (Egloff & Schmukle, 2002; Kim, 2003; Steffens, 2004).

The IAT requires subjects to respond to stimulus exemplars as they are presented on a computer screen by sorting exemplars from four categories into one of two response conditions. It is argued that the ease of the categorization task is related to the strength of the relationship between those concepts in memory. Responses are captured by pressing one of two response keys, traditionally the ‘D’ or ‘K’ keys on a computer keyboard. Response latencies are captured by the computer as the subject responds to the stimulus items, which are then scored to generate mean response times. Traditionally, the difference in mean reaction time between the compatible and incompatible tasks is
known as the IAT effect (Greenwald et al., 1998). The rationale behind the interpretation of the IAT effect as a measure of personality constructs such as the Big Five factors rests on the theoretical definition of the personality self-concept (Asendorpf et al., 2002; Greenwald et al., 2003). Specifically, because the IAT measures relative strengths of association among concepts in memory, the IAT effect can be interpreted as a measure of the associative network of the concept of self with attribute concepts describing one’s personality (or those attributes that the IAT is built to measure).

*Implicit Association Test Procedure and Scoring*

Table 1 presents a visual representation of a typical IAT. The IAT typically consists of five blocks. As an example, an IAT designed to measure Extraversion will be considered. As shown in Table 1, the first block, or *initial target-concept discrimination task*, requires the sorting of stimuli representing either the *self* (as in self-concept) or *other* using one of two response keys.¹ In this case, the keys are ‘D’ and ‘K.’ Individuals press the letter D if the words *me, mine, mine, self* are presented and the letter 'K' if the words *they, them, their, other* are presented. The next block, the *associated attribute discrimination task*, requires the sorting of stimuli representing either *Extraversion* or *Introversion* using the same response keys as the first block. Here, individuals press the D key whenever the words *self-assured, active, talkative, energetic* are presented and the 'K' key whenever the words *quiet, independent, reserved, withdrawn* are presented. The third block, or the *initial combined task*, requires the sorting of stimuli representing *Extraversion* and/or *self* using one response key, and *Introversion* and/or *other* using
Table 1

Example procedure for Extraversion IAT.

<table>
<thead>
<tr>
<th>Block sequence</th>
<th>Discrimination Task</th>
<th>Target Concepts</th>
<th>Attribute Concepts</th>
<th>Key Assignments for stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Target Concept</td>
<td>Self-Other</td>
<td></td>
<td>D key: me, my, mine, self</td>
</tr>
<tr>
<td></td>
<td>Discrimination Task</td>
<td></td>
<td></td>
<td>K key: they, them, there, other</td>
</tr>
<tr>
<td>2</td>
<td>Attribute Concept</td>
<td>Extraversion-</td>
<td></td>
<td>D key: me, my, mine, self</td>
</tr>
<tr>
<td></td>
<td>Discrimination Task</td>
<td>Introversion</td>
<td></td>
<td>K key: they, them, there, other</td>
</tr>
<tr>
<td>3</td>
<td>Initial Combined</td>
<td>Self-Other</td>
<td>Extraversion-</td>
<td>D key: they, them, there, other</td>
</tr>
<tr>
<td></td>
<td>Discrimination Task</td>
<td></td>
<td>Introversion</td>
<td>K key: quiet, independent, reserved, withdrawn</td>
</tr>
<tr>
<td>4</td>
<td>Reversed Target</td>
<td>Other-Self</td>
<td></td>
<td>D key: they, them, there, other</td>
</tr>
<tr>
<td></td>
<td>Concept Discrimination Task</td>
<td></td>
<td></td>
<td>K key: me, my, mine, self</td>
</tr>
<tr>
<td>5</td>
<td>Reversed</td>
<td>Other-Self</td>
<td>Extraversion-</td>
<td>D key: they, them, there, other</td>
</tr>
<tr>
<td></td>
<td>Combined Discrimination Task</td>
<td></td>
<td>Introversion</td>
<td>K key: quiet, independent, reserved, withdrawn</td>
</tr>
</tbody>
</table>

1 Prior research has shown that key assignment does not affect the IAT effect (Greenwald et al., 1998).
another response key. In this example, individuals press the letter 'D' whenever the words self-assured, active, talkative, energetic or me, mine, my, self are presented and the letter 'K' whenever the words quiet, independent, reserved, withdrawn or they, them, their, others are presented. This block constitutes the first component of the IAT effect, or the compatible task. The fourth block, or the reversed target-concept discrimination task, reverses the key assignment of the target concepts and requires the sorting of stimuli representing other or self using different keys. In this example, individuals press the 'D' key whenever the words they, them, their, others are presented and the K key whenever the words me, mine, my, self are presented. The final block, or the reversed combined task, requires the sorting of stimuli representing Extraversion and/or other using one response key and sorting stimuli representing Introversion and/or self using another response key. In our example, individuals press 'D' whenever the words quiet, independent, reserved, withdrawn or they, them, their, others are presented, and would press 'K' whenever the words self-assured, active, talkative, energetic or me, mine, my, self are presented. This final block constitutes the second component of the IAT effect, or the incompatible task.

Both of the combined task blocks (blocks 3 and 5) have practice and trials blocks. Conventionally, the IAT effect would be calculated by subtracting the mean reaction time in block five (e.g., Self and Introversion on the same response key) from the mean reaction time in block three (e.g., Self and Extraversion on the same response key; Greenwald et al., 1998). A Conscientiousness IAT is presented in Table 2 and is identical to the Extraversion IAT presented in Table 1 except stimuli representing Conscientious
## Table 2

Example procedure for Conscientiousness IAT

<table>
<thead>
<tr>
<th>Block sequence</th>
<th>Discrimination Task</th>
<th>Target Concepts</th>
<th>Attribute Concepts</th>
<th>Key Assignments for stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>D key</td>
</tr>
<tr>
<td>1</td>
<td>Target Concept</td>
<td>Self-Other</td>
<td>me, my, mine, self</td>
<td>they, them, there, other</td>
</tr>
<tr>
<td></td>
<td>Discrimination Task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Attribute Concept</td>
<td>Conscientious-</td>
<td>Persistent,</td>
<td>Laid-back, untidy, late,</td>
</tr>
<tr>
<td></td>
<td>Discrimination Task</td>
<td>Unconscious</td>
<td>disciplined,</td>
<td>varying</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>organized,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dependable</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Initial Combined</td>
<td>Self-Other</td>
<td>me, my, mine, self</td>
<td>they, them, there, other</td>
</tr>
<tr>
<td></td>
<td>Discrimination Task</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conscientious-</td>
<td>Persistent,</td>
<td>Laid-back, untidy, late,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unconscious</td>
<td>disciplined,</td>
<td>varying</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>organized,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dependable</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Reversed Target</td>
<td>Other-Self</td>
<td>they, them, there,</td>
<td>me, my, mine, self</td>
</tr>
<tr>
<td></td>
<td>Concept Discrimination Task</td>
<td></td>
<td>other</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Reversed Combined</td>
<td>Other-Self</td>
<td>they, them, there,</td>
<td>me, my, mine, self</td>
</tr>
<tr>
<td></td>
<td>Discrimination Task</td>
<td></td>
<td>other</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conscientious-</td>
<td>Persistent,</td>
<td>Laid-back, untidy, late,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unconscious</td>
<td>disciplined,</td>
<td>varying</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>organized,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>dependable</td>
<td></td>
</tr>
</tbody>
</table>
and Unconscientious have replaced the stimuli representing Extraversion and Introversion.

The D-measure

Recently, Greenwald, Banaji, and Nosek (2003) developed an improved scoring algorithm for the IAT (D-measure; see Table 3). This scoring algorithm improves internal consistency of the IAT, minimizes the effect of prior experience on the IAT, and improves resistance of the IAT to effects associated with order of combined tasks. For the D-measure, both practice and test trials are used in the analysis. In addition, trials with latencies that are greater than 10,000 ms are eliminated and all subjects who have latencies of less than 300 ms on over 10% of trials are also eliminated from analyses. Trials with these extreme values are considered outliers because it is assumed that individuals who have latencies greater than 10,000 ms are not following instructions to respond as rapidly as possible. When the instructions are not followed, the IAT may no longer measure automatic associations. For individuals with latencies lower than 300 ms, it is assumed that these individuals are just rapidly responding without paying attention to the stimuli. As subjects are required to enter a correct response after making an error during the IAT, the latencies associated with trials in which errors are made and corrected by using the mean of correct latencies. In order to calculate the D-score, the difference between mean response time in the compatible and incompatible tasks are calculated for practice and test trials individually. Each of these difference scores are then divided by the pooled standard deviation from each component of the difference score, and the quotients of the two scores are averaged.
<table>
<thead>
<tr>
<th>Step</th>
<th>Scoring Algorithm for D-measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use data from blocks 3, 4, 6, and 7</td>
</tr>
<tr>
<td>2</td>
<td>Eliminate trials with latencies &gt; 10,000ms and eliminate subjects for whom more than 10% of trials have latencies &lt; 300ms</td>
</tr>
<tr>
<td>3</td>
<td>Use all trials remaining after step 2</td>
</tr>
<tr>
<td>4</td>
<td>Compute mean of correct latencies for each block and compute the SD of correct latencies for each block(^a)</td>
</tr>
<tr>
<td>5</td>
<td>Compute one pooled SD for all trials in blocks 3 and 6 and another pooled SD for all trials in blocks 4 and 7(^a)</td>
</tr>
<tr>
<td>6</td>
<td>Use mean latency of correct responses in trials in which errors were made(^a)</td>
</tr>
<tr>
<td>7</td>
<td>Average values from step 5 for each of the four blocks</td>
</tr>
<tr>
<td>8</td>
<td>Compute two difference scores block 3 - block 6 and block 4 - block 7(^a)</td>
</tr>
<tr>
<td>9</td>
<td>Divide each of the two differences by their associated pooled-trials standard deviation from step 5</td>
</tr>
<tr>
<td>10</td>
<td>Average two quotients from step 9</td>
</tr>
</tbody>
</table>

Note. In this scoring algorithm, practice and test trials are treated as separate blocks. Blocks 3 and 6 are practice blocks and blocks 4 and 7 are test blocks. This differs from how the IAT is conceptually explained.\(^2\) In the current study steps 4, 5, 6, and 8 used alternative scoring procedures identified in previous research (Greenwald et al., 2003). This Figure was adapted from Greenwald et al. (2003).
Essentially, the D-score allows the difference in mean response time between the compatible and incompatible tasks to be interpreted as an effect size. The D-measure is in standard deviation units and is very similar to the Cohen’s d measure of effect size (Greenwald et al., 2003). In the previous example of an Extraversion IAT, the magnitude of the D-score reflects the strength of the association between an individuals’ self-concept and the attribute of Extraversion. In other words, a D-score of .50 would indicate a much stronger association with Extraversion as opposed to Introversion (about half a standard deviation) than a D-score of .08, and a D-score of -.25 would indicate a stronger association with Introversion as opposed to Extraversion than a D-score of -.01.

**IAT-Big Five Research**

Recently the IAT has been adapted to measure trait anxiety (Egloff & Schmukle, 2002), achievement motivation (Brunstein & Schmitt, 2004), shyness (Asendorpf et al., 2002), and angriness and anxiousness (Schnabel, Banse, & Asendorpf, 2006). However, only two studies have used Implicit Association Tests to measure Big Five traits as defined by personality researchers (Goldberg, 1990). Steffens (2004) developed IATs to measure Extraversion and Conscientiousness and examined whether these IATs were susceptible to faking. In line with previous research on response distortion and the IAT (Egloff & Schmukle, 2002; Kim, 2003), Steffens found that the IATs were much less susceptible to response distortion than the explicit self-report measures used in the study. Specifically, subjects were unable to fake the Conscientiousness IAT, but they were able to reliably fake the Extraversion IAT.
However, even though the effect size of faking on the Extraversion IAT (Cohen's $d = 1.13$) was large by conventional standards, the effect size of faking on the self-reported Extraversion (Cohen's $d = 6$) was much larger. Steffens also found evidence of construct validity for both IATs. Significant, but low correlations between implicit Extraversion and an NEO-FFI measure of Extraversion ($r = .18$) and implicit Conscientiousness and NEO-FFI measured Conscientiousness ($r = .23$) were obtained for the Conscientiousness and Extraversion IATs developed in the study.

In a subsequent study, Steffens and König (2006) examined whether IATs designed to measure all of the Big Five factors predicted spontaneous behaviors, or behaviors assumed to occur outside of an individual's conscious control. Results showed that implicit measures of Extraversion and Conscientiousness predicted spontaneous behavioral indicators that the self-report measure of personality failed to reliably predict. Specifically, the IAT measure of Conscientiousness predicted spontaneous behavior related to a concentration task (d2 test; Brickencamp, 1994). Steffens and König hypothesized that individuals higher on spontaneous Conscientiousness would complete the self-paced task more slowly and make fewer errors and the results confirmed their hypothesis. Moreover, the IAT measure of Extraversion predicted spontaneous behaviors related to the amount of time subjects spent in a social interaction.

Despite the interesting findings, this study had many methodological and conceptual flaws and limitations. First, some of the indicators of spontaneous behaviors used as dependent variables in Steffens and König (2006) were questionable. Specifically, one of the indicators consisted of asking participants to rate how appealing each of two activities were, and participants had to do so under time pressure.
Theoretically, behaviors made under time pressure should result from more spontaneous processing (Fazio, 1990). However, Steffens and König did not enforce or measure response speed so it is difficult to verify that this was actually an indicator of a spontaneous behavior. Because time pressure was not enforced, this indicator may actually have been a more controlled behavior. Additionally, the second indicator was a measure of how much time participants spent answering post-experiment questions. Although this indicator was predicted by the IAT Extraversion measure and not self-reported Extraversion, it was unclear why this behavior would be representative of spontaneous behavior. Steffens and König (2006) also did not examine controlled behaviors. Therefore, it is difficult to determine whether the implicit Big Five measures were less predictive of controlled behaviors, as previous research would suggest, or if they predict controlled behaviors.

In addition to differential behavior prediction, Steffens and König (2006) also provided evidence of construct validity for the implicit measure of Conscientiousness. Specifically, the IAT measure of Conscientiousness was positively related to the self-report Conscientiousness measure \((r = .22)\). The IAT measure of Extraversion, however, was not related to the self-report measure of Extraversion. This finding indicates that the IAT Extraversion measure may have been measuring a different construct than the self-report measure.

The stimuli used for the IATs developed by Steffens were obtained from the German version of the NEO-Five Factor Inventory. As such, the Steffens and König (2006) study had one additional limitation. Nosek, Greenwald, and Banaji (2005) presented several criteria to judge the stimuli used in IATs. Specifically, stimuli should
(a) be easily identified as members of the category they represent, (b) not be confounded with any of the other categories in the IAT, and (c) adequately represent the constructs of interest (Nosek, Greenwald, & Banaji, 2005). The stimuli used in Steffens and König’s (2006) IATs do not appear to meet all these criteria. First, they seem to be confounded with positive and negative valence. The English translations of the stimuli used for the IATs in Steffens (2004) and Steffens and König (2006) appear to have negative valences (e.g. aimless, lazy, chaotic used to represent ‘Not Conscientious’). When stimuli with negative valences are used in self-concept Implicit Association tests another category distinction may be added to the IAT. In this situation, subjects are able to discriminate the stimuli based on the valence of the words instead of on the attribute of interest.

Essentially, this means that instead of completing a Conscientiousness IAT, for example, subjects are completing an IAT similar to a self-esteem IAT (Greenwald & Farnham, 2000) in which they are simply categorizing positively valenced words and negatively valenced words as indicators of self and other categories. In addition to this problem, some of the stimuli used in the IATs developed by Steffens and colleagues do not appear to accurately represent the constructs of interest. For example, the Extraversion IAT developed used stimuli that had either ambiguous meaning in the English translation (e.g. balanced) or did not reflect the construct of interest (e.g. attentive). Improved stimuli may increase correlations between implicit and explicit measures of Extraversion and Conscientiousness and self-report measures.

Summary
IATs can be adapted to measure personality traits, including the Big Five factors. Implicit measures in general have been shown to predict different categories of behaviors than explicit measures. IAT measures of personality, specifically Extraversion and Conscientiousness measures, have also been shown to predict different categories of behaviors than self-report measures of the same traits. However, the mixed results obtained by Steffens (2004) and Steffens and König (2006), as well as the other limitations discussed previously, suggest the validity and reliability of IAT measures of Extraversion and Conscientiousness have not been fully established in the literature to date.

In order to show that implicit measures complement self-report personality measures, it must be demonstrated that (1) implicit measures are measuring the same or similar construct(s) as self-report measures, (2) implicit measures show evidence of criterion-related validity, (3) implicit measures show incremental validity above self-report measures in the prediction of job performance, and/or (4) implicit measures predict certain performance criteria better than self-report personality measures. Specifically, if implicit measures do not show criterion-related validity, they will not be able to assist organizations in differentiating between applicants who are more or less likely to be effective performers. If implicit measures show criterion-related validity, but not incremental validity over self-report personality tests, they will not account for any additional variance in job performance, which means there would be no significant gain for an organization to utilize an implicit measure of personality in addition to self-report measures. Incremental validity is especially important in this case, as implicit measures
should predict different behaviors and thus add to the prediction of performance criteria beyond self-report measures.

Hypothesis Development

The present research addresses two main research questions. First, can the IAT be adapted to measure Extraversion and Conscientiousness? More specifically, can evidence for construct validity demonstrated by convergent and discriminant relations with self-report measures of personality be established for IAT measures of Extraversion and Conscientiousness? Second, can IATs developed to measure Extraversion and Conscientiousness predict work performance? More specifically, do these IATs have criterion-related validity and/or incremental validity for predicting objective and subjective job performance criteria?
Study 1

In order to establish the validity of the IAT and demonstrate its usefulness as a measure of personality, an initial study was designed to ascertain whether a well-known self-report measure of personality (specifically, the Big Five factor IPIP) was correlated with IATs designed to assess the strength of self-identification with those same personality traits. Previous research suggests that self-report measures and implicit measures should be correlated, provided there is no motivation to engage in presenting oneself in a favorable light (Greenwald et al., 2002; Paulhus, 1984).

Hypotheses: Study 1

Research has shown that implicit and explicit measures of different constructs (attitudes, personality, and self-esteem) do correlate with each other (Egloff & Schmukle, 2002; Greenwald et al., 1998; Greenwald & Farnham, 2000). Generally, the effect sizes of the relationships are small to moderate (Asendorpf et al., 2002; Brunstein & Schmitt, 2004; Nosek et al., 2005; Steffens, 2004; Steffens & König, 2006). Based on this research and the discussion above two hypotheses are proposed for Study 1:

H1: IPIP Extraversion and EIAT scores will show small to moderate positive correlations with each other.

H2: IPIP Conscientiousness and CIAT scores will show small to moderate positive correlations with each other.

As mentioned earlier, Steffens and König (2006) did not find evidence of convergent relations between self-reported Extraversion and the IAT measure of Extraversion used. Further, many of the stimuli items used in these measures either did
not adequately represent the constructs of interest and/or appeared to have negative valences when translated into English. The EIAT and CIAT developed for use in the current study utilized four stimuli for each of the four attribute concepts of interest (Conscientious, Not Conscientious, Extraverted, and Introverted), and the stimuli were reviewed by two I/O psychologists and one Organizational Behavior faculty member to ensure they adequately represented the constructs of interest.\(^3\)

\(^3\) IATs can validly measure implicit processes with as few as two stimuli (Greenwald et al., 1998), but four stimuli is ideal (Nosek et al., 2005).
Methods

Participants

Ninety-three undergraduate students from Rice University participated in exchange for course credit.

Measures

*Extraversion Implicit Association Test.* This methodology is consistent with that described in Greenwald et al. (1998) and is basically identical to that used in previous IAT research. The procedure and stimuli for the EIAT appear in Table 1. The *Extraversion* attribute category is represented by the items *self-assured, active, talkative,* and *energetic,* while the *Introversion* attribute category is represented by the items *quiet, independent, reserved,* and *withdrawn.* The stimuli selected were reviewed by I/O faculty members and graduate students. Although there was no formal valence check on the stimuli conducted during Study 1, upon careful review of the stimuli by two I/O psychology faculty members, one Organizational psychologist, and I/O psychology graduate students, valence issue were not encountered. Additionally, this group of reviewers deemed all stimuli as representative of the constructs they were intended to represent. For the first, second, and fourth blocks, subjects are exposed to twenty-four total trials per block, with twelve of each category item randomly chosen from the pool of possible items, resulting in three exposures to each item. Subjects were exposed to a total of sixty-four items during the initial combined task and sixty-four items during the reversed combined task, broken down into a practice block of twenty-four trials and a test trial comprising forty trials. Participants are given instructions to respond as quickly and as accurately as possible. The EIAT was administered and the data recorded via the
Inquisit software program. The data were analyzed based on the new scoring algorithm for the IAT (Greenwald et al., 2003). The full listing of stimuli used can be found in Appendix A.

Conscientiousness Implicit Association Test (CIAT). The CIAT procedure is conceptually and methodologically identical to the EIAT described above, with the exception of the attribute category items. Instead of attributes that represent Extraversion and Introversion, the CIAT incorporates attributes that represent Conscientious and Unconscientious. The Conscientious category included the items persistent, disciplined, organized, and dependable, and the Unconscientious category included the items laid-back, untidy, late, and varying. The stimuli selected for the CIAT were also reviewed by I/O faculty members and reviewed by students. The CIAT was administered and the data recorded via the Inquisit software program. The full listing of stimuli used can be found in Appendix A.

Five Factor IPIP. The Five Factor IPIP (Goldberg et al., 2006), used in the current study is a 50 item measure of the Big Five factors. Ten items correspond to each of the Big Five factors. Participants are asked to rate how accurately each of the 50 items describes them on a Likert-type scale ranging from 1 (very inaccurate) to 5 (very accurate). Sample items include “I am the life of the party” and “I am always prepared” for Extraversion and Conscientiousness, respectively. Sample items for Agreeableness and Neuroticism were “I feel others’ emotions” and “I am easily disturbed,” respectively. A sample item for Openness to Experience was “I am full of ideas.” For the purposes of this study, the IPIP was programmed to be presented as part of a computer-based procedure. Participants were instructed to use the number pad to respond the statements
on the screen and hit the return key when they were ready to move on to the next question.
The responses to the ten items representing each of the Big Five Factors are summed to create a composite score for each of the Big Five. Scores can range from 0-50 for each of the factors, with larger numbers indicating higher levels of the factor. The Five Factor IPIP has demonstrated adequate reliability in previous research with reliability coefficients of .87 for Extraversion, .82 for Agreeableness, .79 for Conscientiousness, .86 for Neuroticism, and .84 for Openness to Experience (Goldberg et al., 2006), and is highly correlated with Goldberg's (1992) Big Five factor markers (Goldberg et al., 2006). See Appendix B for IPIP items.

Design

The IATs were counterbalanced across participants such that participants received one of four versions of the IATs (see Table 4). Previous research has shown that the effect of previous experience on IATs (faster response times on subsequent IATs) is reduced when IATs are counterbalanced across participants (Greenwald et al., 2003). Since participants were completing two IATs, it was necessary to counterbalance them to reduce the effect of prior exposure to one IAT. It has been the convention in IAT research that the explicit measures are completed before the IAT measures (Greenwald et al., 1998), so the present study did not counterbalance the presentation order of the Five Factor IPIP and the IATs. Other researchers have counterbalanced presentation order of the explicit and implicit measures (Egloff & Schmukle, 2002).

Procedure

All participants completed the IPIP, CIAT and EIAT measures on either a laptop or desktop computer via a web-based program created by Millisecond Software, LLC.
Online IATs, specifically those accessible via the web at http://implicit.harvard.edu, generally have one major limitation: respondents are able to participate multiple times (Greenwald et al., 2003).

Table 4
Counterbalanced IAT presentation order for all three studies

<table>
<thead>
<tr>
<th>Counterbalanced order</th>
<th>IAT order</th>
<th>First Compatibility Task</th>
<th>Second Compatibility Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1. EIAT</td>
<td>Self + Extraversion</td>
<td>Self + Introversion</td>
</tr>
<tr>
<td></td>
<td>2. CIAT</td>
<td>Self + Conscientious</td>
<td>Self + Unconscientious</td>
</tr>
<tr>
<td>2</td>
<td>1. EIAT</td>
<td>Self + Introversion</td>
<td>Self + Extraversion</td>
</tr>
<tr>
<td></td>
<td>2. CIAT</td>
<td>Self + Unconscientious</td>
<td>Self + Conscientious</td>
</tr>
<tr>
<td>3</td>
<td>1. CIAT</td>
<td>Self + Conscientious</td>
<td>Self + Unconscientious</td>
</tr>
<tr>
<td></td>
<td>2. EIAT</td>
<td>Self + Extraversion</td>
<td>Self + Introversion</td>
</tr>
<tr>
<td>4</td>
<td>1. CIAT</td>
<td>Self + Unconscientious</td>
<td>Self + Conscientious</td>
</tr>
<tr>
<td></td>
<td>2. EIAT</td>
<td>Self + Introversion</td>
<td>Self + Extraversion</td>
</tr>
</tbody>
</table>

As participants in the current study were not able to participate multiple times, and there have been no other reports of differences between online IATs and those completed by participants in a laboratory (Greenwald et al., 2003), it did not appear that
having students complete the IATs and Five Factor IPIP online as opposed to in an actual lab posed any threat to internal or external validity in this study. Participants acknowledged informed consent by responding to an initial screen that described the study and required the subject to press the space bar to continue. Participants where then instructed that they would be completing a series of self-report measures and categorization tasks. The IPIP was presented first, followed by the counterbalanced IATs. For the IPIP participants were instructed to use the number pad to respond to the statements on the screen and press the ‘return’ key when they were ready to move on to the next question. Instructions for the IATs were consistent with prior presentations of the IAT (Greenwald et al., 1998). Specifically, participants were told to respond as quickly and as accurately as possible using the letters 'D' and 'K' on the keyboard. Following completion of all materials, participants were debriefed via a presentation on the screen, and then instructed to email the experimenter upon completion of the study to have credit assigned.
Results

Reliability of Measures. Estimates of internal consistency for the IAT measures were calculated by first computing Cronbach’s alpha for two subsets of the IAT data (compatible trials and incompatible trials). The reliability estimate for each IAT measure was then calculated by using the formula for the reliability of difference scores (Nunnally & Bernstein, 1994). The internal consistencies for the EIAT and CIAT scales and the IPIP measures are shown on the diagonal of Table 5.

Table 5
Correlations between implicit and explicit measures Study 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean(SD)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.CIAT</td>
<td>.45(.37)</td>
<td>.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.EIAT</td>
<td>-.09(.53)</td>
<td>.18+</td>
<td>.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.Consc.</td>
<td>34.74(7.20)</td>
<td>.27**</td>
<td>.10</td>
<td>.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.Extra.</td>
<td>31.60(7.30)</td>
<td>-.04</td>
<td>.41**</td>
<td>-.14+</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.Agreeab.</td>
<td>39.19(5.58)</td>
<td>.02</td>
<td>.12</td>
<td>.26*</td>
<td>.22*</td>
<td>.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.Openness</td>
<td>34.63(4.26)</td>
<td>.01</td>
<td>.08</td>
<td>-.12</td>
<td>.13+</td>
<td>.09</td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>7.Neurot.</td>
<td>30.35(7.80)</td>
<td>-.10</td>
<td>.02</td>
<td>.16+</td>
<td>-.05</td>
<td>.00</td>
<td>.02</td>
<td>.89</td>
</tr>
</tbody>
</table>

n = 93 for all correlations. + p < .10, *p < .05, **p < .01, one-tailed tests. Reliability estimates are on the diagonal.

IPIP-IAT correlations. The various counterbalancing procedures described previously did not affect responses to either the CIAT or EIAT (all p's = n.s.). Prior to
analysis, the IPIP data for Conscientiousness and Extraversion were aggregated to form a composite score for each personality trait. Correlations among all implicit and self-report measures are shown in Table 5. Hypothesis 1 and Hypothesis 2 were concerned with the relationship between the EIAT, CIAT, and their self-report counterparts. Hypothesis 1 predicted that the EIAT and IPIP Extraversion score would be positively related. Hypothesis 2 predicted that the CIAT and IPIP Conscientiousness score would be positively related. A one-tailed correlational analysis was conducted to test each directional hypothesis. As Table 5 illustrates, both hypotheses were supported. Consistent with expectations, the self-report IPIP measures correlated significantly with their implicit counterparts (Conscientiousness: \( r(93) = .27, p = .010 \); Extraversion: \( r(93) = .41, p < .001 \)).

Additional analyses were conducted to examine whether evidence of divergent relations existed in addition to the evidence of convergent relations obtained. Examination of the correlations between the EIAT, CIAT, and the remaining Big Five traits revealed evidence of divergent relations for both IATs. Specifically, the EIAT and CIAT were not significantly related to the other self-report IPIP scores. The CIAT was not significantly correlated with any of the other Big Five factors, with near zero relationships between the CIAT and Agreeableness (\( r(93) = .02, p > .05 \)), Openness (\( r(93) = .008, p > .05 \)), Extraversion (\( r(93) = .04, p > .05 \)), or Neuroticism (\( r(93) = -.10, p > .05 \)). Furthermore, as you can see in Table 5, the EIAT was not significantly related to Agreeableness, Openness, Neuroticism, or Conscientiousness.
Study 1 Discussion

Study 1 was conducted to examine the construct validity of the EIAT and CIAT via exploring convergent and discriminant relations between these measures and self-reported IPIP Big Five traits. Results indicated that both IATs demonstrated evidence of construct validity. Although evidence of construct validity for the EIAT was obtained (inconsistent with Steffens and König 2006), the current study used a different self-report measure than used by Steffens and König. A more direct comparison of the my revised IATs and Steffens’ IATs would be possible if the current study used the same self-report measure as used in Steffens (2004) and Steffens and König (2006).
Study 2

Study 2 was conceptually identical to Study 1, with the exception that the Big Five Factor IPIP used in the first study was replaced with the NEO-FFI (Costa & McRae, 1989). Study 2 was conducted to examine the construct validity of the EIAT and CIAT using the same measure (English version) used by Steffens (2004) and Steffens and König (2006). This allowed for a direct comparison of the results obtained in Steffens’ studies and those obtained in the current study. Second, the NEO-FFI is an popular self-report measure of personality used in selection research. The exact same hypotheses were tested in Study 2 as in Study 1. Specifically, that self-reported Extraversion and Conscientiousness will show low to moderate positive correlations with their counterpart IAT measures.
Method

Participants

Thirty-seven undergraduate students from Rice University participated in the current study for course credit.

Measures

*EIAT and CIAT.* These measures were consistent with previous research (Greenwald et al., 2001) and identical to Study 1.

*Computerized NEO-Five Factor Inventory.* The NEO-Five Factor Inventory (NEO-FFI; Costa & McCrae, 1989) is a 60 item measure of the Big Five factors. The NEO-FFI contains 12 items for each of the factors. Participants were asked to rate how well each of the items described how they feel about themselves. Participants responded on a Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) with each statement. Example items for Extraversion and Conscientiousness include “I laugh easily” and “I have a clear set of goals and work toward them in an orderly fashion.” Sample items for Agreeableness, Openness to Experience and Neuroticism were “Most people I know like me,” “I have a lot of intellectual curiosity,” and “I often feel tense and jittery,” respectively. For the purposes of this study, the NEO-FFI was programmed to be presented as part of a computer-based procedure. Participants were instructed to use the number pad to respond the statements on the screen and press the ‘return’ key when they were ready to move on to the next question. Scores on each of the items representing a factor were summed to form a composite score on each of the five factors. Scores range from 0-60 with higher scores indicating higher levels of a trait (for Neuroticism lower scores indicate higher levels of Emotional Stability). The NEO-FFI is a commercially
available personality test used for a variety of purposes in applied settings and has demonstrated adequate reliability levels for each of the Big Five factors (Costa & McCrae, 1989).

Procedure

The procedure for Study 2 was identical to Study 1 except for the aforementioned replacement of the IPIP measure with the NEO-FFI.
Results

The various counterbalancing procedures previously described did not affect responses on the EIAT or CIAT measures. Prior to analysis, the NEO-FFI data for Conscientiousness and Extraversion were aggregated to form a composite score for each personality trait. Consistent with expectations, FFI measured Conscientiousness correlated significantly with the CIAT, $r(37) = .35, p = .018$, one-tailed, and FFI measured Extraversion correlated significantly with the EIAT, $r(37) = .31, p = .033$, one-tailed.

Additional analyses were conducted to examine whether evidence of divergent relations existed. Examination of the correlations between the EIAT, CIAT, and the remaining Big Five traits revealed evidence of divergent relations for both IATs. Specifically, the EIAT was not significantly related to any other self-report NEO-FFI scores excluding Extraversion. The CIAT, however, was significantly correlated with one other Big Five factor in addition to Conscientiousness. The CIAT was significantly related to FFI Agreeableness, $r(37) = .35$. 
Study 2 Discussion

Results of Study 2 also suggested that implicit measures of personality traits correlate significantly with another traditional self-report measure of personality, specifically NEO-FFI. These correlations suggest convergent and divergent relations for implicit measures of personality, at least where Conscientiousness and Extraversion are concerned. Furthermore, the relationships found between the EIAT and FFI Extraversion and the CIAT and FFI Conscientiousness were greater in magnitude than those obtained in Steffens’ research. Although an empirical test was not conducted, the revised stimuli used in the EIAT and CIAT for the current study may have accounted for this difference in convergent relations between IAT measures and NEO-FFI measures. Considering research has shown Conscientiousness and Extraversion to be the most useful traits in predicting work performance, these results suggest that the CIAT and EIAT may be viable measures of important personality traits.

Although evidence of convergent and divergent relations was established, upon examination of the correlations in Study 2, two findings were unexpected. First, the CIAT was moderately correlated with FFI Agreeableness. This finding cannot be easily explained. It is unlikely that the stimuli used for the IAT (Appendix A) tapped into some facet of Agreeableness and this result did not appear with the IPIP measure. This result may simply have been an artifact, but future research should further explore the relationship between self-reported Agreeableness and the CIAT. Second, the results revealed a significant relationship between the EIAT and CIAT ($r = .30$, $p = .038$). This result was not entirely unexpected, however, as previous research has shown positive correlations between conceptually unrelated IATs that is likely due to common method
bias (Blanton, Jaccquard, Gonzales, & Christie, 2006). Future research should also examine whether the relationships between conceptually unrelated IAT is solely due to common method bias.
Study 3

Previously, it was noted that Haines and Sumner (2006) recently called for evidence of criterion-related validity for implicit measures of Extraversion and Conscientiousness. This third study is an attempt to answer Haines and Sumner’s call as well as build on the limited previous Big Five IAT research. Specifically, this third study leverages the findings in Studies 1 and 2 by examining the relationships between the EIAT, CIAT, self-report personality measures, and different facets of work performance in a sample of retail sales representatives. It was reasoned that validating the EIAT and CIAT with a sample of sales representatives would present an opportunity to examine the criterion-related validity of the EIAT and CIAT in a field study. Additionally, the need for development of measures of personality that are more resistant to response distortion and can potentially complement existing self-report measures of personality motivated Study 3.

Hypotheses: Study 3

Previous research on personality-performance relationships has shown that Extraversion and Conscientiousness predict job performance for sales jobs (Barrick & Mount, 1991; Barrick et al., 2001; Salgado, 1997). Also, self-reported Extraversion and Conscientiousness predict both objective and subjective performance criteria (Barrick et al., 2001); therefore, the following hypothesis was proposed:

H1: Self-reported Extraversion and Conscientiousness will be positively related to subjective and objective performance criteria.

Previous research has shown that implicit and explicit personality measures predict different categories of behaviors. Asendorpf et al. (2002) and Steffens and
colleagues (2004; 2006) found evidence of differential behavior prediction of implicit and explicit measures for the personality traits of shyness, Extraversion, and Conscientiousness, respectively. Furthermore, MODE model (Fazio, 1990) suggests that supervisor performance ratings may be better predicted by explicit measures that tap into controlled processing. Objective performance may be better predicted by implicit personality measures.

H2: EIAT and CIAT scores will be positively related to subjective and objective performance. However, EIAT and CIAT scores will show stronger positive relationships with objective performance than self-reported Extraversion and Conscientiousness, and SR Extraversion and Conscientiousness show stronger positive relationships with subjective performance than the EIAT and CIAT.

Because previous research has yet to examine the criterion-related validity of implicit measures of personality, research has, up till now, yet to assess whether implicit measures have predictive power beyond explicit measures in predicting job performance criteria. Because implicit measures typically predict different categories of behaviors than explicit measures (Asendorpf et al., 2002; Steffens & König, 2006), it is expected that the implicit measures of personality used in the current study will add incremental validity in the prediction of job performance for sales representatives. Based on this logic, the following hypotheses are proposed:

H3: The EIAT and CIAT will show incremental validity beyond self-report Extraversion and Conscientiousness in the prediction of objective performance criteria.
H4: The EIAT and CIAT will show incremental validity beyond self-report Extraversion and Conscientiousness in the prediction of subjective performance criteria.
Methods

Participants

Ninety-four individuals working as cell phone sales representatives at a cell phone company participated in this study. Data for seven participants were excluded due to computer malfunctions resulting in loss of data during data collection. The remaining 87 participants were predominately Hispanic (56.3%). Twenty-one percent of the sample was Caucasian and 13% of participants were African American. The mean age was 23.93 (SD = 6.43) and just over half of the participants (56.3%) were male.

Measures

The IAT measures completed in this study were identical to those participants completed in Study 2 (CIAT, EIAT, and NEO-FFI).

Demographics. The demographic questionnaire consisted of questions on age, gender, ethnicity/race and native language and tenure. The questionnaire is shown in Appendix C.

EIAT and CIAT. These measures are consistent with previous research (Greenwald et al., 2001) and identical to Study 1 and Study 2.

Computerized NEO-Five Factor Inventory. This measure was identical to Study 2.

Sales effectiveness. Sales effectiveness was measured using a 13 item scale of how effective sales employees were before, during, and after sales encounters. In order to create the sales effectiveness measure, two managers (SMEs) were asked to generate performance behaviors that differentiated between effective and ineffective sales representatives during sales encounters. Following the generation of effective and ineffective performance behaviors, the behaviors were then categorized based on content
similarity. Six performance domains involved in sales encounters were developed jointly by SMEs and the researchers; *Proactive Selling, Customer-Focused Sales Approach, Assertiveness in Closing Sales, Interpersonal Skill, Product/Work Knowledge, and Conscientious Initiative*. Graphic rating scales were then developed for each dimension and the related groups of content similar, effective and ineffective sales behaviors were used as anchors for the high and low ends of the graphic rating scales. The six dimensions of sales effectiveness were broken up into multiple items to improve the reliability of the measure and to prevent double-barreled items (Nunnally & Bernstein, 1994).

Managers were asked to respond to each item on a 7-point graphic rating scale with behavioral anchors on the low and high end of the scale. Specifically, managers were provided the following instructions:

For each rating form, (1) Carefully read the dimension of performance you will be rating, (2) Carefully read the behavioral statements listed next to the rating scale, (3) Decide whether the employee exhibits high, moderate, or low performance based on the behavioral statements and (4) Circle the number on the rating scale that best represents how high, moderate, or low the employee is on the dimension.

Responses on each of the items were summed to create a composite measure of sales effectiveness. Scores ranged from 0-91 with higher scores indicating better sales performance. See Appendix C for ratings forms.

*Global job performance*. Managers provided an overall rating of the employees’ performance and dependability. Specifically, managers were asked to respond to the statements “How would you rate the employees’ overall dependability” on a Likert-type
scale ranging from 1 (unsatisfactory performance) to 3 (exceptional performance) and "How would you rate the employees' overall dependability" on a Likert-type scale ranging from 1 (not at all dependable) to 3 (very dependable). Responses on each of the items were summed to create a composite measure of global performance. Scores ranged from zero to six with higher scores indicating better sales performance. See Appendix C for rating form.

Activations per hour. Activations per hour consisted of the total commission an employee has earned for each activation plan multiplied by the percentage of total sales for each activation plan company-wide. This product was then divided by the number of hours the employee worked during the month to obtain activations per hour for each employee. Values ranged from 0.00 to 1.00 with larger values indicating more cell phone activations per hour, or better performance.

Design

Prior to the experiment, managers informed employees that they would have their weekly scheduled meeting at the training department. Twenty computers were set up in the training room with software necessary to run the EIAT, CIAT, and a computerized version of the NEO-FFI. Computer desks were set up in pairs of two with three desk pairs in a row. In order to ensure confidentiality, subject numbers were assigned as employees entered the training room. The experimenter handed the participants a demographic questionnaire with a random four-digit number on it before they took a seat at one of the available computers. At the designated start time, participants read two consent forms, the first of which was a standard consent form informing participants of the voluntary
nature of the research, the risks and discomforts associated with the experiment, and that they would be completing a personality assessment. The second consent form consisted of a letter drafted by the vice president of the company stating that the research would be used to develop worker profiles and would not have any effect on employees’ continued employment at the company. Upon completion of these consent forms and answering any questions, participants were given instructions on how to complete the personality assessment and IATs on the computer. Upon completion of the demographic questionnaire, the NEO-FFI, and the EIAT and CIAT, participants returned their demographic questionnaires, face down, to the experimenter and were informed that they would be receiving a debriefing statement from their manager providing details on the experiment.
Results

Data, outlier, and reliability analysis. Prior to any statistical analyses, the data were checked for abnormalities, missing data, and to ensure assumptions of correlation/regression were met (linearity, homoscedasticity, and errors of prediction normally distributed). Outlier analysis and examination of abnormalities, missing data, and assumption checks were conducted using JMP-IN software. A univariate outlier analysis was conducted and this analysis did not reveal any outlier problems. Missing data, however, resulted in n’s ranging from 63-67 for analyses including activations per hour and n’s ranging from 83-87 for all other analyses.

Estimates of internal consistency for the IAT measures were calculated by first computing Cronbach’s alpha for two subsets of the IAT data (compatible trials and incompatible trials). The reliability of each IAT measure was then calculated by using the formula for the reliability of difference scores (Nunnally & Bernstein, 1994). The internal consistencies for the EIAT and CIAT scales are shown in the diagonal of Table 6. The internal consistencies of the NEO-FFI measures are also shown in the diagonal of Table 6. All measures demonstrated satisfactory reliability.

IAT-NEO-FFI correlations. Initial analysis of the correlations between the implicit and explicit Big Five measures is presented in Table 6. Inconsistent with the results of Study 2, the self-reported NEO-FFI measures of Extraversion and Conscientiousness did not significantly correlate with the CIAT and EIAT measures ($r = .11, p > .05$ for Extraversion and $r = .09, p > .05$ for Conscientiousness). Interestingly, Neuroticism was negatively correlated with the EIAT ($r = -.27, p = <.05$) and Agreeableness positively correlated with the EIAT ($r = .23, p < .05$). There were no
Correlation matrix of all variables in Study 3 with means and standard deviations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td></td>
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<tr>
<td>05</td>
<td></td>
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<tr>
<td>06</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.
significant correlations between self-reported personality traits and the CIAT.

Unexpectedly, NEO-FFI scores on Extraversion, Conscientiousness, Agreeableness, and Neuroticism were all significantly correlated.

**NEO-FFI-Performance correlations.** Hypothesis 1 predicted that self-reported Extraversion and Conscientiousness would be positively related to subjective and objective performance criteria. One-tailed correlational analyses were conducted on the NEO-FFI personality data to test this directional hypothesis. Hypothesis 3 was partially supported. As presented in Table 7 and consistent with prior research (Barrick & Mount, 1991), significant correlations between Sales Effectiveness ($\alpha = .96$) and NEO-FFI measured Extraversion ($r = .18, p = .05$) and Conscientiousness ($r = .19, p < .05$) were obtained. Furthermore, Extraversion correlated positively with managers' global performance ratings ($r = .24, p < .05$), as did Conscientiousness ($r = .22, p < .05$). Contrary to expectations, the correlation between Conscientiousness and activations per hour did not reach conventional levels of significance; however the relationship was marginally significant ($r = .16, p = .099$). Also contrary to expectations, Extraversion was not related to activations per hour. Overall, Hypothesis 3 was partially supported.

**IAT-Performance correlations.** Hypothesis 2 predicted that the EIAT and CIAT scores would be positively related to subjective and objective performance criteria, but that the CIAT and EIAT would more strongly predict objective performance and SR FFI-Extraversion and Conscientiousness would more strongly predict subjective performance. One-tailed correlational analyses were also conducted to test the first part of this directional hypothesis. Refer to Table 7 for correlations between the IATs and
Table 7.
Correlations between performance measures and IAT and NEO-FFI scores Study 3.

<table>
<thead>
<tr>
<th></th>
<th>Activations per hour(\text{a})</th>
<th>Sales Effectiveness(\text{b})</th>
<th>Global performance(\text{b})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activations per hour</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Sales Effect.</td>
<td>-.01</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Global perform.</td>
<td>.11</td>
<td>.83**</td>
<td>-</td>
</tr>
<tr>
<td>CIAT</td>
<td>.22*</td>
<td>.06</td>
<td>.03</td>
</tr>
<tr>
<td>EIAT</td>
<td>.03</td>
<td>.23*</td>
<td>.18*</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.16+</td>
<td>.19*</td>
<td>.22*</td>
</tr>
<tr>
<td>Extraversion</td>
<td>-.08</td>
<td>.18*</td>
<td>.24*</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>-.09</td>
<td>.13</td>
<td>.13</td>
</tr>
<tr>
<td>Openness</td>
<td>-.22*</td>
<td>.06</td>
<td>.03</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-.11</td>
<td>-.18*</td>
<td>-.24*</td>
</tr>
</tbody>
</table>

\(\text{a}\) \(n = 64-65\) depending on missing data \(\text{b}\) \(n = 84-85\) depending on missing data.
+ \(p < .10\), *\(p < .05\), **\(p < .01\), one-tailed tests.

performance measures. Hypothesis 2 was partially supported as well. Interestingly, the EIAT correlated significantly with subjective sales effectiveness \(r = .23, p < .05\), but contrary to expectations, the CIAT did not significantly correlate with sales effectiveness \(r = .06, p > .28\). In addition, the EIAT was significantly related to managers’ global performance ratings \(r = .18, p < .05\), but the CIAT was not significantly related to managers’ global performance ratings \(r = .03, p > .41\). As expected, the implicit measure of Conscientiousness, the CIAT, significantly correlated with activations per
hour \((r = .22, p = .04)\). Unexpectedly, the EIAT was not significantly correlated with activations per hour \((r = .03, p > .40)\).

The results also revealed what appeared to be stronger correlations between the EIAT and sales effectiveness \((r = .23)\) than for FFI Extraversion \((r = .17)\) and FFI Conscientiousness-sales effectiveness relationships \((r = .19)\). Furthermore, the relationships between global performance and FFI Extraversion \((r = .24)\) and global performance and FFI Conscientiousness \((r = .22)\) appear to be stronger than the EIAT-global performance relationship \((r = .18)\). In order to examine whether these correlations were significantly different, several tests of the significance of the difference between dependent \(r\)'s were conducted (Cohen & Cohen, 1983). Contrary to Hypothesis 2, results showed that none of these correlations were significantly different from one another.

**Hierarchical Regressions.** Hypothesis 3 and Hypothesis 4 predicted the EIAT and CIAT would show incremental validity beyond self-reported Extraversion and Conscientiousness in the prediction of both objective (activations per hour) and subjective (managers' sales effectiveness and global performance ratings) performance criteria. Hierarchical regression analysis was conducted in order to test Hypothesis 3 and Hypothesis 4.

With regard to Hypothesis 3, which predicted the IATs would account for unique variance in prediction of activations per hour, only self-reported Conscientiousness and the CIAT were included in the regression. The EIAT and self-reported Extraversion were excluded from the regression because correlational analysis did not reveal a significant correlation between the EIAT and activations per hour and self-reported Extraversion and activations per hour. Self-reported Conscientiousness was included in the regression
because it showed a marginally significant correlation with activations per hour. Table 8 presents the results of the regression of activations per hour onto self-reported Conscientiousness (Step 1) and the CIAT (Step 2). Self-reported Conscientiousness did not reliably predict activations per hour in Step 1, however, the beta weight for the CIAT was marginally significant in Step 2 after controlling for self-reported Conscientiousness. Self-reported Conscientiousness accounted for 3% of the variance in activations per hour, while the CIAT accounted for an additional 4% of the variance in activations per hour, showing some support for Hypothesis 5.

Table 8.
Hierarchical Regression Results for Activations per hour performance criterion.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td>.026</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.162</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td>.069+</td>
<td>.042+</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.142</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIAT</td>
<td>.207+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$n = 63$, Step 1 df = 1, Step 2 df = 2. + $p < .10$, *$p < .05$, **$p < .01$.

Table 9 shows the hierarchical regression of sales effectiveness ratings onto Extraversion and Conscientiousness (Step 1) and the EIAT (Step 2). The CIAT was excluded from the regression due to the non-significant relationship between the CIAT
and sales effectiveness revealed in the correlational analysis. Hypothesis 6 received some support as well. Self-reported Extraversion and Conscientiousness were not significant predictors of sales effectiveness in Step 1 or Step 2. However, the beta weight for the EIAT in Step 2 was marginally significant. In addition, self-reported Extraversion and Conscientiousness accounted for 5% of the variance in sales effectiveness ratings while the EIAT accounted for an additional 4% of the variance in sales effectiveness.

Table 9.
Hierarchical Regression Results for Sales Effectiveness performance criterion.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td>.046</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.137</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>.112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td>.083+</td>
<td>.037+</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>.103</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EIAT</td>
<td>.196+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$n = 83$. Step 1 df = 2, Step 2 df = 3. + $p < .10$, *$p < .05$, **$p < .01$.

Table 10 shows the hierarchical regression of global job performance ratings onto Extraversion and Conscientiousness (Step 1) and the EIAT (Step 2). The CIAT was also excluded from this analysis due to the non-significant relationship between the CIAT and global job performance ratings revealed in the correlational analysis. As can be seen in Table 10, self-reported Extraversion and Conscientiousness accounted for 7% of the
variance in global performance ratings, but the EIAT did not account for a significant amount of variance in the prediction of global performance beyond self-reported Extraversion and Conscientiousness. Overall, Hypothesis 4 was partially supported.

Table 10

Hierarchical regression results for global performance criterion.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td>.072*</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>.179</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td>.092</td>
<td>.020</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>.172</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EIAT</td>
<td>.143</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. $n = 83$. Step 1 df = 81, Step 2 df = 80. $+ p < .10$, *$p < .05$, **$p < .01$.

Additional Analyses. The results of the correlational analysis indicated that all of the self-reported Big Five scores were related. This may have been evidence that some of the employees in the sample were engaging in impression management or responding in a socially desirable manner. In order to move beyond pure speculation based on correlations, a more concrete examination of response distortion was conducted. Specifically, the NEO-FFI mean scores from the college sample in Study 2 ($n = 37$) were
compared to the NEO-FFI mean scores from the sales employee sample (n = 87). As Figure 1 illustrates, the sample of sales employees had higher mean scores on Extraversion (M=46.09, SD=5.01), Conscientiousness (M=50.98, SD=5.38) and Agreeableness (M=45.92, SD=5.54) than the college sample (M=41.24, SD=6.18 for Extraversion, M=43.49, SD=6.27 for Conscientiousness, and M=42.11, SD=6.51 for Agreeableness). In addition, the sales employee sample had lower mean scores on Neuroticism than the college sample (M=26.90, SD=6.21, and M=33.35, SD=6.37 respectively). Independent sample t-tests revealed all differences between the two samples on these NEO-FFI scores were significant (all p’s < .01).
Figure 1.

Mean NEO-FFI scores in student and sales employee samples.

Note. Sales sample n = 87, college sample n = 37. All mean differences excluding Openness significantly different (p<.001), two-tailed tests.
Study 3 Discussion

Study 3 was conducted to (1) further examine the construct validity of EIAT and CIAT measures, and (2) examine whether implicit IAT measures and explicit measures of Extraversion and Conscientiousness predicted job performance for a sample of cell phone sales representatives. It was hypothesized that implicit and explicit measures would predict both objective and subjective performance criteria for the retail salespeople in this sample. Furthermore, I wanted to understand whether or not the EIAT and CIAT would predict different types of behavior than are predicted by SR measures of personality. Results indicated that, contrary to expectations, the CIAT and EIAT were not significantly related to self-reported Conscientiousness and Extraversion, respectively. However, both implicit and explicit measures were able to predict performance and differential relationships emerged between explicit and implicit measures and the performance criteria obtained. The relationships between self-reported Extraversion and Conscientiousness and subjective performance were consistent with previous research with SR Extraversion and SR Conscientiousness predicting supervisor ratings of performance and a trend towards Conscientiousness predicting objective performance in the current study (Barrick & Mount, 1991; Barrick et al., 2001). However, contrary to expectations, implicitly measured Extraversion and Conscientiousness were not more strongly related to objective performance than SR Extraversion and Conscientiousness. SR Extraversion and Conscientiousness also did not more strongly predict subjective performance than implicitly measured Extraversion and Conscientiousness. Additionally, the EIAT accounted for unique variance in the prediction of sales effectiveness and the CIAT accounted for unique variance in the prediction of activations per hour.
Perhaps the most intriguing finding was that the CIAT was related to activations per hour, but was not related to subjective performance (sales effectiveness and managers' global performance rating). Moreover, the EIAT was related to subjective performance but was not related to objective performance. I predicted that the EIAT and CIAT measures would be predictive of both objective and subjective performance assessments, so why did these two implicit measures show differential prediction of objective and subjective performance criteria? One explanation may involve the nature of subjective and objective performance criteria. Essentially, subjective performance criteria were manager ratings that were representative of managers' perceptions of how well employees were performing. Activations per hour, the objective performance criterion, was representative of how employees actually performed. It is possible that the EIAT was predictive of subjective performance because Extraversion is a social trait that is easily observable. Managers' ratings are typically based on past observations of employee behaviors over time, and it is possible that managers remember employee behaviors that were most salient. Many of the spontaneous (often nonverbal) behaviors representative of Extraversion are likely as readily observable by managers as the controlled behaviors representative of Extraversion; thus, spontaneous extraverted behaviors (i.e. expressiveness of speech, eye contact, loose body posture) may also have been salient to managers. Additionally, it may also be that spontaneous extraverted behaviors are not conducive to doing those things required to increase activations per hour (i.e. paperwork). In other words, extraverted spontaneous behaviors may naturally lead employees to end up in situations (e.g. having lengthy, non-business related discussions with customers) that make it more difficult for them to complete paperwork or perform other tasks related
to activating phones. Ultimately, the presence of these spontaneous extraverted behaviors was important in managers' perceptions of how well employees performed.

Conscientiousness, on the other hand, is not a social trait and the spontaneous behaviors related to Conscientiousness may not be as readily observable as spontaneous extraverted behaviors. For example, it is unlikely that the thoroughness with which employees reviewed guidelines with customers or the accuracy with which employees completed paperwork is easily detected by managers conducting observations. Consequently, the CIAT was not predictive of subjective performance criteria. The CIAT, however, may have been predictive of objective performance because certain conscientious behaviors were essential to making sales for this sample of employees (i.e. putting in correct paperwork, ringing up orders correctly, reviewing and/or noting policies and procedures with customers). Although these behaviors were not as salient or as easily observable as extraverted behaviors were (which again may explain the CIAT's lack of prediction of perceived or subjective performance), routinely completing these tasks with care and diligence, and exhibiting other spontaneous conscientious behaviors, were important to actual performance of the sales employees. These conclusions are consistent with what Steffens and König (2006) found for the implicit Conscientiousness measure predicting spontaneous behavior related to completion of a concentration task. Taking the time to complete the paperwork and complete other important tasks and doing so in a diligent manner would result in fewer mistakes and better performance. Sales employees that can do this on their own with no observation are more likely to be successful, and sales employees that are higher in spontaneous Conscientiousness are more likely to behave in this way.
The current study is the first to examine implicit and explicit personality-performance relationships. The findings of Study 3 are important for several reasons. First, in order to establish IAT measures as viable complements to self-report measures it is imperative that evidence of criterion-related validity is obtained for these measures. The results of the present study show evidence of criterion-related validity for both the EIAT and CIAT, and these findings support the use of EIAT and CIAT as complementary measures to self-report measures. Secondly, previous research has shown differential behavior prediction for explicit and implicit measures and the current results demonstrating differential prediction of subjective and objective job performance are unique and novel findings that add to the personality-job performance literature. Finally, the results of the current study are important because they are the first step in establishing the significance of implicit measures of Extraversion and Conscientiousness in personality and selection research.
General Discussion

Haines and Sumner (2006) suggested that implicit self-concept measures could benefit organizations in three areas including measuring (1) organizational attitudes, (2) stereotypes in organizations, and (3) self-concepts in organizations. Although it seems obvious that implicit measurement of self-concepts could be fruitful in the area of personality, to date little research has been conducted in this area. The focus of the current research was on obtaining evidence of the validity of implicit measures of Extraversion and Conscientiousness; specifically, Implicit Association Test measures of Extraversion and Conscientiousness. Several strategies for obtaining evidence of validity were used in the studies presented. The three studies presented provide evidence that (1) IATs designed to measure Extraversion (EIAT) and Conscientiousness (CIAT) are related to standard self-report measures of personality and thus show construct validity and (2) the EIAT and CIAT predict important work behaviors. Furthermore, Study 3 demonstrated the importance of implicit measures in that there was some evidence that they accounted for unique variance in the prediction of different work performance criteria and, in the case of the CIAT, reliably predicted objective performance when explicit measures did not. According to these findings, implicit measures of personality are valid, in that they appear to assess the same underlying constructs that traditional self-report measures of personality do, show evidence of criterion-related validity, but also capture unique variance in the criterion.

One interesting and unexpected result was obtained across the three studies. The results of Study 3 showed unusually high intercorrelations among the self-reported Big Five factors and there were no significant relationships between IAT measures and their
counterpart self-report measures. It is possible that the correlations between the CIAT, EIAT, and self-reported Conscientiousness and Extraversion, respectively, were attenuated by employees' attempts to manage impressions, as correlations between explicit and implicit measures diverge when the motivation to manage impressions is present (Poehlman, Uhlmann, Greenwald, & Banaji, 2006). Study 2 showed the expected relationships between the CIAT, EIAT, and self-reported (NEO-FFI) Conscientiousness and Extraversion in a college sample that likely had no reason or motivation to manage impressions, and direct comparisons of the mean Big Five scores for the sample of college students from Study 2 and the mean Big Five scores for the sample of sales employees in Study 3 revealed significantly higher scores in the sales sample than in the student sample. Thus, it may be that impression management was influencing the responses of the sales representatives in Study 3. As a result, the lack of evidence of convergent and discriminant relations in Study 3 may have been due to response distortion on the part of the sales employee sample.

It may also have been the case that the differences between the two samples were truly reflective of differences in personality profiles between the two groups. It is easy to imagine sales employees, given the nature of their work, who truly are higher on Conscientiousness, Extraversion, Agreeableness (dealing with customers), and lower on Neuroticism than a group of undergraduate students. This is one issue with comparing non-equivalent groups in regard to faking; it is difficult to know whether the group differences are reflective of true applicant/employee-student differences in profiles or evidence of response distortion via faking. Whether or not the differences found between the groups in the current study were reflective of possible response distortion or true
group differences, the validity coefficients of the self-report measures obtained in Study 2 should not be questioned as previous research has shown that social desirability and impression management do not affect the criterion-related validities of personality measures (Hough et al., 1990). More importantly, the EIAT and CIAT were still predictive of work performance, which would actually strengthen the case for their potential use in addition to self-report measures if response distortion was present.

The findings of the research reported have several implications. Based on the results of Study 2, IAT measures of personality may be viable complementary measures to traditional self-report measures. As Haines and Sumner (2006) suggest and attitude IAT and implicit measurement research has shown, implicit measures may allow researchers and organizations to predict more of the criterion space as these measures typically measure different categories of behaviors than self-report measures (Asendorph et al., 2002). The current research provides empirical evidence of differential prediction of objective and subjective performance of implicit Big Five measures and some evidence of the incremental validity of implicit measures in prediction of job performance. Secondly, the present findings suggest that some spontaneous behaviors associated with implicitly measured Extraversion and Conscientiousness differ in their observability. Spontaneous acts of Extraversion may be more readily observable and easier to detect than spontaneous acts of Conscientiousness. Given the importance of spontaneous Conscientiousness in sales jobs, it may be beneficial for sales organizations/supervisors to take the time to identify these behaviors.

Limitations and Future directions
Despite the interesting and novel findings in the present research, there were a few limitations. First, Study 1 demonstrated that the IAT is a reliable, construct-valid measure of Extraversion and Conscientiousness, but the correlations between implicit and explicit Extraversion and Conscientiousness measures were moderate at best. Although the present findings support previous research (Steffens, 2004), currently, there is no definitive answer as to why implicit measures show such low correlations with self-report measures, even in situations where response distortion and self-deception are unlikely. It is difficult to truly ascertain the extent to which an implicit measure of personality and a self-report measure of personality that are only correlated in the .22 to .40 range are truly measuring the same construct. Given that previous research has shown low to moderate correlations between implicit and explicit measures, the results of Study 1 and 2 were taken as evidence of construct validity. The question of the extent to which the EIAT and CIAT are measuring the same construct is a question that should be asked; however, the current data, unfortunately, cannot answer this question. Secondly, as much as I tried to increase control, Study 3 was still a field study. There were likely many factors that could have unknowingly affected results because of the lack of control field studies typically have. However, as described in Study 3’s procedure section, some amount of structure was achieved during data collection (See Appendix C), and, furthermore, the field study allowed for more generalizable results.

Most importantly, the sample size in Study 3 was relatively small for a validity study (n = 87). The presence of missing data further reduced the sample size for many of the analyses in Study 3. Depending on the sample size and correlation, post-hoc power calculations revealed power ranging from .25 (lowest) to .56 (highest) for the correlations
of interest in the Study 3. Furthermore, the hierarchical regressions showed low power, with power ranging from .43 (regression of activations per hour onto FFI Conscientiousness and CIAT) to .63 (regression of global performance onto FFI Conscientiousness, Extraversion, and EIAT). Low power especially affected the results of the hierarchical regressions as many of the results were either marginally significant at the .10 alpha level or appeared to be approaching significance. Although many significant effects were obtained, future research should replicate the current results in larger samples to address the problems of external validity and power.

The current research suggests several areas for future research. First, previous research has proposed that implicit measures are more likely to predict spontaneous behaviors and explicit measures are more likely to predict controlled behaviors (Asendorpf et al., 2002; Fazio, 1990). The results of the current study were somewhat suggestive of this proposition. Specifically, the CIAT reliably predicted objective performance but did not predict subjective performance, and the self-report measures reliably predicted subjective performance, but did not reliably predict objective performance. Spontaneous Conscientiousness was predictive of objective performance, but it is likely that FFI Conscientiousness predicted subjective performance because the more observable controlled conscientious behaviors (i.e. offering customers related services and/or arriving to work on-time/early) were important to managers’ perceptions of performance. Given that controlled conscientious behaviors are likely more observable than spontaneous conscientious behaviors, the results suggest that the CIAT was predicting difficult to observe spontaneous behaviors related to objective performance and self-report Conscientiousness was predicting the more observable controlled
behaviors related to perceptions of performance. It is not entirely clear, however, exactly what behaviors represent spontaneous conscientious and extraverted behaviors and what behaviors are representative of controlled conscientious and extraverted behaviors. Future research should attempt to disentangle the controlled behaviors that should be better predicted by explicit measures of personality and the spontaneous behaviors that implicit personality measures should better predict. Asendorph et al. (2002) and more recently Steffens and König (2006), were among the first to examine differential behavior prediction with implicit measures of personality; however, future research in I/O psychology should focus on conducting more comprehensive studies examining differential behavior prediction for implicit measures of Extraversion and Conscientiousness. Until a clear understanding of the behaviors associated with implicit and self-report personality measures is developed, we will be unable to completely explain the utility of implicit measures of personality such as the EIAT and CIAT.

Finally, the IAT has received much criticism in the eight years since it was developed as a measure of implicit social cognition (Greenwald et al., 2006). Criticisms have ranged from criticisms of the IAT’s internal validity (familiarity of stimulus items; Dasgupta, Greenwald, & Banaji, 2003; Dasgupta, McGhee, Greenwald, & Banaji, 2000) to the IAT’s construct validity (salience asymmetry; Rothermund & Wentura, 2004; Rothermund, Wentura, & De Houwer, 2005) and the metric properties of the IAT (Blanton & Jaccard, 2006; Blanton et al., 2006; Karpinski & Steinman, 2006). In light of these criticisms, other researchers have developed similar implicit measures that have been touted as having improved psychometric properties over the IAT. The Single Category Implicit Association Test (SCIAT; Karpinski & Steinman, 2006) and Simple
Association Test (SAT; Blanton et al., 2006) are two other measures that have been developed. Previous research on these newly developed implicit measures has focused on implicit attitudes and stereotyping and has yet to explore the domain of personality. If the IAT is not the most psychometrically sound measure, which many of its opponents would suggest, it may not be as useful to Human Resource professionals as another implicit measure of personality might be. Future research should first adapt these additional instruments to measure personality and then examine the differences and similarities of these measures and whether there are differences in the predictive or criterion-related validity of these implicit measures. Future research will likely bring improvements to each of the measures discussed.

**Final Conclusions**

The current study provides evidence that the Extraversion Implicit Association Test and the Conscientiousness Implicit Association Test are construct valid and can predict performance and behaviors that are important to organizations. Study 1 and 2 examined the construct validity of the EIAT and CIAT and Study 3 focused on the criterion-related validity of these IAT measures. The results presented in this paper are only a first step in incorporating implicit measures of personality into job assessment research. Much more research and scrutiny of IATs designed to measure personality traits is needed before they can be considered viable complements to valid self-report measures. The measurement properties of these IATs, as well as the reliability and validity of these measures need further examination. The current research hopes to spur further interest in the exploration of the validity of Implicit Association Tests, and
implicit measures in general, as measures of the Big Five factors and other personality traits.
References


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Appendix A

*Stimuli used for EIAT*

<table>
<thead>
<tr>
<th>Concept</th>
<th>Stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>me, mine, my, self</td>
</tr>
<tr>
<td>Other</td>
<td>they, them, there, other</td>
</tr>
<tr>
<td>Extraversion</td>
<td>self-assured, active, talkative, energetic</td>
</tr>
<tr>
<td>Introversion</td>
<td>quiet, independent, reserved, withdrawn</td>
</tr>
</tbody>
</table>

*Stimuli used for CIAT*

<table>
<thead>
<tr>
<th>Concept</th>
<th>Stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>me, mine, my, self</td>
</tr>
<tr>
<td>Other</td>
<td>they, them, there, other</td>
</tr>
<tr>
<td>Conscientious</td>
<td>persistent, disciplined, organized, dependable</td>
</tr>
<tr>
<td>Unconscientious</td>
<td>laid-back, untidy, late, varying</td>
</tr>
</tbody>
</table>
Appendix B

Big Five Factor IPIP Questionnaire (Page 1 of 2)

For the next several questions, please indicate your level of agreement with each statement by selecting the number on the rating scale that best describes the way you feel about yourself. To indicate your response, type the number that corresponds to your rating using the appropriate number key. You may change your answer by pressing a different number. Press the return key to record your response and continue to the next page.

[1="strongly disagree"; 2="disagree"; 3="neutral"; 4="agree"; 5="strongly agree"]

1 = "I am the life of the party."
2 = "I am interested in people."
3 = "I am always prepared."
4 = "I am relaxed most of the time."
5 = "I have a rich vocabulary."
6 = "I feel comfortable around other people."
7 = "I sympathize with others' feelings."
8 = "I pay attention to details."
9 = "I seldom feel blue."
10 = "I have a vivid imagination."
11 = "I start conversations."
12 = "I have a soft heart."
13 = "I get chores done right away."
14 = "I get stressed out easily."
15 = "I have excellent ideas."
16 = "I talk to a lot of different people at parties."
17 = "I take time out for others."
18 = "I like order."
19 = "I worry about things."
20 = "I am quick to understand things."
21 = "I don't mind being the center of attention."
22 = "I feel others' emotions."
23 = "I follow a schedule."
24 = "I am easily disturbed."
25 = "I use difficult words."
26 = "I don't talk a lot."
27 = "I make people feel at ease."
28 = "I am exacting in my work."
29 = "I get upset easily."
30 = "I spend time reflecting on things."
31 = "I keep in the background."
32 = "I am not really interested in others."
33 = "I leave my belongings around."
34 = "I change my mood a lot."
35 = "I am full of ideas."
36 = "I have little to say."
37 = "I insult people."
38 = "I make a mess of things."
39 = "I have frequent mood swings."
40 = "I have difficulty understanding abstract ideas."
41 = "I don't like to draw attention to myself."
42 = "I am not interested in other people's problems."
43 = "I often forget to put things back in the proper place."
44 = "I get irritated easily."
45 = "I am not interested in abstract ideas."
46 = "I am quiet around strangers."
47 = "I feel little concern for others."
48 = "I shirk my duties."
49 = "I often feel blue."
50 = "I am full of ideas."
Appendix C: Study 3 Materials

C.1: Standardized Instructions Provided to Participants

Thank you for your participation today. It is greatly appreciated. Before we begin, there are two consent forms sitting next to your computer. I need everyone to read the first consent form (addressed to Pocket Communication employees). This consent form is basically stating that your participation in this research is not mandatory and is voluntary. Everyone who does participate will be paid regular hourly wages for participation and in addition to your hourly wage; you will also be entered into a drawing for one of seven $50 cash rewards given after completion of the research project. More importantly, this form states that your participation in this research will not have any negative affect on your employment status. If you agree to continue in this research, please sign the form and then put it face down on the desk. If you have any questions or concerns, or do not wish to participate in this study, please raise your hand. Please look up when you are ready to continue.

The next consent form, titled Predicting Sales Behavior with the IAT is a standard consent form used for research conducted within academic universities. Please read through this document and provide your signature if you consent to participation in this research. Key points on this form are that it will take approximately 30-45 minutes to complete the research, participation is voluntary, you will be compensated for your time, and all information you provide will be completely confidential. Only I and other researchers working with me will have access to your data. All information reported to Pocket Communications will be reported in the aggregate. Please sign and put this form face-down if you are willing to participate. Again, if you do not wish to participate or have any question, please raise your hand now.

Today you will be completing a series of questionnaires and categorization tasks. The first questionnaire is sitting next to your computer with a four digit # written on the top left-hand corner. Please remember this # as it is your participation # and will be the only way to identify the information you provide. Please start with this form. If you have any questions please raise your hand and I will address it.

In addition to this survey, the remaining questionnaires and tasks will be administered on the computer. As you see, the same four digit number appears on the screen. You will first complete a survey. This survey requires responses to several statements. You will be using the number pad (top #’s on laptops) to select your answer and pressing the return key to proceed.

The categorization tasks will follow this survey. For these tasks you will be sorting items into different categories. You will be using your index fingers on the letters ‘D’ and ‘K’ on the keyboard to do this. Words must be sorted in a certain category before you can continue, so be sure to press the correct key if an X appears in order to continue. All instructions I just provided are built into the program, so be sure to pay close attention to them as you proceed through the materials. Most, if not all of you will find these tasks difficult to complete at times, but just remember, there are NO Right or Wrong answers on these tasks. Just do your best. Please do not distract other participants during the experiment.

When you finish these tasks, a black screen will appear and inform you that you have completed the experiment. At that point please quietly gather your consent forms and survey and place them face down on the desk, and you will be finished.
Appendix C.2

Demographic questionnaire

Additional Information
A demographic profile of participants is very helpful in understanding the entire set of responses. All your responses are completely anonymous. This information will be held in confidence and will only be reported in a summary fashion.

1. You are: 
   ______ Female (0) 
   ______ Male (1) 

2. Your relationship status: 
   ______ Single (1) 
   ______ Married (2) 
   ______ Separated (3) 
   ______ Divorced (4) 
   ______ Widowed (5) 
   ______ Long-term partnership (6) 

3. Which category best describes your current job? 
   ______ Student (1) 
   ______ Academic Administration (5) 
   ______ Clerical (2) 
   ______ Technical Support (6) 
   ______ Retail Sales (3) 
   ______ Other (7) (please describe) 
   ______ Physical Plant (4) 

4. How long have you been employed at this job? 

5. How long do you plan to stay at this job? 

6. If you are/were a student, what is/was your college major? 

7. Your age: ______

8. How would you best describe your race/ethnicity? 
   ______ Asian American or Asian (1) (please specify): 
   ______ African American (2) 
   ______ White/European American (3) 
   ______ Latino/a or Hispanic (4) (please specify): 
   ______ Biracial (5) (Please specify): 
   ______ Another ethnicity not listed above (6) (Please specify): 

9. What is your FIRST language? That is, the language you speak most often.

10. How long have you been speaking English? (Check one option below) 
    ______ Less than 5 years (1) 
    ______ 5-10 years (2) 
    ______ 11-15 years (3) 
    ______ more than 15 years (4)
Appendix C.3

Sales Effectiveness Rating Forms (page 1 of 15)

Instructions

Employee Name# ________________________________

For each rating form, (1) Carefully read the dimension of performance you will be rating (2) Carefully read the behavioral statements listed next to the rating scale (3) Decide whether the employee exhibits high, moderate, or low performance based on the behavioral statements and (4) Circle the number on the rating scale that best represents how high, moderate, or low the employee is on the dimension.

When you finish, please return the packet of ratings forms to the Max McDaniel. Thank you for your time, it is greatly appreciated.
(1) Carefully read the dimension of performance you will be rating (2) Carefully read the behavioral statements listed next to the rating scale (3) Decide whether the employee exhibits high, moderate, or low performance based on these behavioral statements and (4) Circle the number on the rating scale that best represents how high, moderate, or low the employee is on the dimension.

PROACTIVE SELLING 1: Taking initiative to attract customers, initiate conversations, and initiate sales encounters.

HIGH

7
Stands in front of kiosk, or behind desk, and smiles at customers.
Verbally acknowledges and greets customers.

6

5

MODERATE

4

LOW

2
Stands behind the kiosk or in positions where employee cannot attract customer’s attention.
Does not smile or greet customers.
Talks and ignores customers.

1
PROACTIVE SELLING 2: Taking initiative to attract customers, initiate conversations, and initiate sales encounters.

HIGH

MODERATE

LOW

1

2

3

4

5

6

7

Handed out phone plan information to customers and makes announcements when the opportunity occurs.

Does not provide customers with phone plan information. Passively waits for customers to ask for assistance/ask questions before initiating sales encounters.
CUSTOMER-FOCUSED SALES APPROACH 1: Focusing on customers' needs and wants in order to ensure customer satisfaction.

HIGH

Asks probing questions pertaining to customers' price ranges and the features they desire.

MODERATE

Sells phones to customers without probing customers to find out which features they desire.

LOW
CUSTOMER-FOCUSED SALES APPROACH 2: Focusing on customers' needs and wants in order to ensure customer satisfaction.

- **HIGH** (7): Takes the time to explain important information to customers (i.e. Value Pocket, Return policies) during every sale encounter.

- **MODERATE** (4):

- **LOW** (1):
  - Impatiently rushes customers, rushes through important information, or rarely provides customers with Value Pocket, Return policy information.
ASSERTIVENESS IN CLOSING SALES 1: Taking the initiative to effectively complete sales by using closing tactics and rebuttals.

HIGH
7

Utilizes proper closing tactics such as saying "Today" consistently throughout every interaction.
Consistently restates the value of Pocket services at the end of sale.

MODERATE
4

LOW
1

Waits passively for customers to decide outcome of encounters (i.e. does not use any closing tactics).
ASSERTIVENESS IN CLOSING SALES 2: Taking the initiative to effectively complete sales by using closing tactics and rebuttals.

HIGH

MODERATE

LOW

7  Responds to customers' concerns with appropriate rebuttals (i.e., I understand your concern, but...)

6

5

4  Rebuttals at inopportune times during encounters that can make customer irate or does not rebuttal at all during encounters.

3

2

1
INTERPERSONAL SKILL 1: Interpreting social cues, actively listening to customers, and articulating to customers effectively.

**HIGH**

- Actively listens to customers by restating customers' needs/wants, and/or nodding to show customers they are paying attention.
- Maintains consistent eye contact with customers.
- Attention is completely focused on customers.

**MODERATE**

- Engages in other activities (i.e. looking online,) while customer is speaking.
- Interrupts customers in order to answer phone calls or speak to coworkers.
- Eyes are focused only on phones or phone information. Little, if any, eye contact with customers is made.

**LOW**
INTERPERSONAL SKILL 2: Interpreting social cues, actively listening to customers, and articulating to customers effectively.

HIGH

7
Recognizes customers' demeanor/mood and acts accordingly (ex. recognizes potential customer is irate so leaves customer alone).

MODERATE

5

4
Approaches all customers without regard for customer demeanor/mood. Does not adjust approach on case by case basis.

LOW

3

2

1
PRODUCT/WORK KNOWLEDGE 1: Demonstrating accurate and thorough knowledge of phones, rate plans and business policies during sales encounters.

- **HIGH**
  - Quickly points out phones that meet customers' needs.
  - Presents phones to customers based on detailed product specifications.
  - Provides accurate information on phones and rate plans to customers.

- **MODERATE**
  - Stumbles when customer asks to see a phone with a specific feature (i.e. camera).
  - Presents little or no information on phones to customers.
  - Gives inaccurate or false phone/rate plan information to customers.

- **LOW**
PRODUCT/WORK KNOWLEDGE 2: Demonstrating accurate and thorough knowledge of phones, rate plans and business policies during sales encounters.

HIGH

7
- Reviews product summary reports in detail with customers.
- Physically reviews Return-Exchange policies with customers.
- Discusses the difference between Value Pocket and Rate plans with customers.

MODERATE

6

5

4

3

LOW

2
- Hands summary reports to customers and asks customers to review details at a later date.
- Informs customers that Return-Exchange policies can be reviewed later, or does not inform customers of Return-Exchange policy.
- Rarely mentions Value Pocket or additional services (i.e. long distance, text/pic messaging) to customers.
CONSCIENTIOUS INITIATIVE 1: Taking the initiative to be organized, dependable, and thorough in day to day work activities.

HIGH

7 - Checks inventory every morning and at closing.
    Orders additional inventory whenever stock is low.
    Always checks work emails daily.

MODERATE

5 - Rarely checks inventory, or only checks inventory once a day.
   Waits until stock is completely gone to order necessary inventory.
   Occasionally checks work emails, or never checks work emails throughout the work day.

LOW

1 -
CONSCIENTIOUS INITIATIVE 2: Taking the initiative to be organized, dependable, and thorough in day to day work activities.

- **HIGH**
  - 7
  - Wipes kiosks down and ensures kiosks/work stations are presentable at the end of each workday.

- **MODERATE**
  - 4

- **LOW**
  - 2
  - Leaves kiosks cluttered and messy at the end of each workday.
CONSCIENTIOUS INITIATIVE 3: Taking the initiative to be organized, dependable, and thorough in day to day work activities.

HIGH

7

Always arrives at work when scheduled.
Clocks in and out for designated lunch breaks.

MODERATE

6

5

4

Consistently calls in to work less than 2 hours before start of shift.
Does not take and/or clock in/out for lunch.

LOW

3

2

1
Sale Effectiveness Rating Forms (page 15 of 15)

Please rate the employee on a scale of 1-3 for the following two questions. Circle your answer.

What is your overall rating of this employees' performance?

1 2 3
Unsatisfactory Satisfactory Exceptional
performance performance performance

How would you rate the employees' overall dependability?

1 2 3
Not at all Somewhat Very dependable
dependable dependable dependable